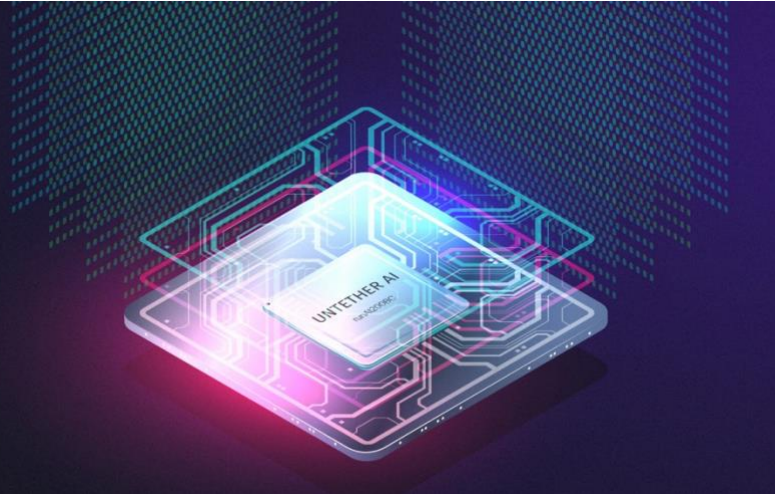


# UNTETHER AI

## Arbitrary Computation with tsunAI<sup>mi</sup>® Accelerator Cards



### Technology

- PCI-Express card form factor for easy integration to existing infrastructure
- 2 PetaOps of INT8 performance per card
- 800MB of on-chip SRAM per card

### Functionality

- Basic Linear Algebra
- Discrete Fourier Transforms
- 2D time-series convolutions
- Scalar activations like ReLU
- Exponents/multiply

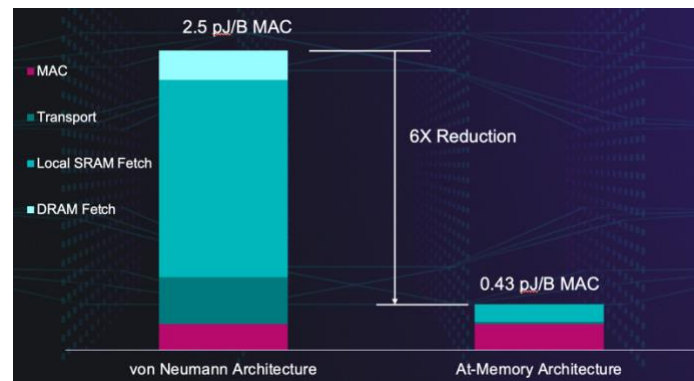
### HPC Applications

- Surface Water Models
- Weather Research and Forecasting
- Drug Discovery and Computational Chemistry

[www.untether.ai](http://www.untether.ai)  
[info@untether.ai](mailto:info@untether.ai)

### The nature of compute is changing

As process advances shrink the size of transistors exponentially, wire lengths shrink linearly. Today, even the most advanced CPUs and GPUs struggle with this fact of physics, wasting up to 90% of the power used for a MAC operation on the data movement rather than on the computation itself. Adding cores, or increasing the attach rate of GPUs, isn't going to solve the efficiency bottlenecks these architectures currently face. A new architecture is needed.



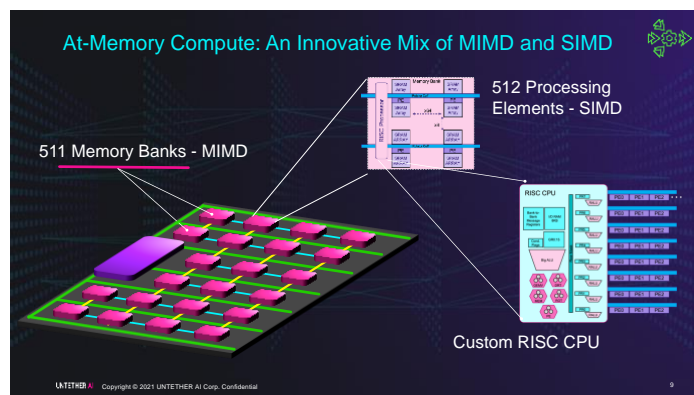
### tsunAI<sup>mi</sup>®: a versatile compute engine for more than just deep learning

In building the best deep learning accelerator, we ended up with a powerful general purpose linear algebra engine. By eliminating the data movement bottleneck that costs energy and performance in competing von-Neumann architectures, we see similar improvements to performance in virtually all arbitrary computations.

**COMPUTE DENSITY** A single tsunAI<sup>mi</sup>® tsn800 PCIe card gives you command of over one million processing elements and two thousand custom 32-bit RISC-V cores, each with dedicated memory, delivering 2 PetaOps of INT8 performance per card.

**FLEXIBILITY** A low-level instruction set for the Processing Elements (PEs) and access to the RISC-V cores allows for virtually any arbitrary computation, including discrete Fourier transforms, 2D time series convolutions, and more.

**EFFICIENCY** Spatial and sequential optimizations allow for the most efficient processing of memory-intensive workloads, with over 200x the on-chip memory bandwidth compared to von Neumann architectures.



### Familiar tools, simple installation, and operation

The imAI<sup>gine</sup>™ software development kit (SDK) enables researchers to quickly create performant HPC workloads using a C-based custom kernel development API. The PCI-Express form factor makes it plug-and-play with your existing on-premise x86 or ARM servers. The imAI<sup>gine</sup> runtime API is built to seamlessly integrate into your existing workflow.

## Notice

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